DOCUMENT RESUME

ED 431 031 TM 029 865

AUTHOR Mojkowski, Charles
TITLE District Information Technology Plans and Planning: Monitoring Implementation and Assessing Impact.
PUB DATE 1999-04-21
NOTE 16p.; Paper presented at the Annual Meeting of the American Educational Research Association (Montreal, Quebec, Canada, April 19-23, 1999).
PUB TYPE Information Analyses (070) -- Reports - Descriptive (141) -- Speeches/Meeting Papers (150)
EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS *Educational Planning; Elementary Secondary Education; Evaluation Methods; *Information Technology; *School Districts; Technological Advancement
IDENTIFIERS *Impact Evaluation; Monitoring

ABSTRACT

A method is described for the evaluation of information technology (IT) use in school districts. The approach is based on studies of IT evaluation and experience in evaluating IT in several school districts. The proposed approach relies on five components: (1) multiple indicators and measures of performance; (2) balanced attention to implementation and impact; (3) multiple data collection and reporting strategies; (4) the use of IT for the evaluation; and (5) ways to help a district enhance its IT capacity. Many problems with IT can be traced to faulty IT planning and design, while others relate to specific problems with the design itself. Implications for practice, policy, and research are discussed, with attention to planning, IT design, and the conduct of the evaluation of IT implementation. (Contains 42 references.) (SLD)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED 431 031

District Information Technology Plans and Planning: Monitoring Implementation and Assessing Impact

Charles Mojkowski

Graduate School
Johnson & Wales University
Providence, RI 02903

Presented at the
Annual Meeting of the
American Educational Research Association
Montreal
April 21, 1999

TM029865

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)
☑ This document has been reproduced as received from the person or organization originating it.
☐ Minor changes have been made to improve reproduction quality.
• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

PERMISSION TO REPRODUCE AND DISSEMINATE THIS MATERIAL HAS BEEN GRANTED BY
Charles Mojkowski
TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

BEST COPY AVAILABLE

District Information Technology Plans and Planning:
Monitoring Implementation and Assessing Impact

Charles Mojkowski
Johnson & Wales University

Motivated by national and state requirements and other incentives, most school districts have prepared an information technology (IT) plan and begun its implementation. Because these plans age as quickly as the technologies they address, many districts update them yearly. Most do so, however, with little or no data on the effectiveness of their efforts. Indeed, despite the detail and dynamic complexity (Senge, 1990) of bringing IT into the schools, few districts even systematically document their implementation efforts. As *Education Week* (Zehr, 1998) and others have noted, evaluation data on the impact of technology on student learning remains quite ambiguous, providing meager justification for the millions schools are spending on technology (Postman, 1995; Stoll, 1995; Oppenheimer, 1997; Bryson, 1998; Bloom, 1999).

This situation is not likely to change unless districts incorporate sound evaluation designs into their IT plans and successfully execute them. The real benefit of planning, after all, is in the learning that it catalyzes. Districts that evaluate their technology plans and initiatives can learn more and better about how to refine and redesign them. To capture that learning, districts need to develop and implement processes for 1) ongoing collection of data on key variables and indicators, 2) timely communication of findings to key decision-makers, and 3) effective use of new knowledge to guide their decisions regarding improvement and redesign. The challenge is to help districts craft and use rigorous evaluation systems.

This paper describes learning from many years of helping districts design IT evaluation systems. This work, almost always done as part of developing the strategic technology plan itself, has been conducted in dozens of districts of all sizes, including most recently New York City (Center for Educational Leadership and Technology, 1997), Philadelphia (Center for Educational Leadership and Technology, 1998), and New London, Connecticut (Technology Applications Associates, 1999). Our particular interest is in how IT evaluation is viewed, designed, and conducted in districts, what impediments and facilitators exist, and how district practitioners might address them. Since much of this work is still under way, our observations and conclusions are preliminary. Nevertheless, these findings help to shape a line of inquiry and identify variables that merit a more focused examination. This report, therefore, marks a transition from a broad exploration of key factors in a complex system to a more analytical approach addressed to specific variables.

I begin with a review of selected contextual variables that impinge on IT evaluation in districts and schools and then provide a brief description of selected features, components, and processes of the IT evaluation system. The principal focus of this report, however, is on what we are learning about how districts evaluate what they are doing with technology. This learning has become increasingly more focused during the last few years and has provided us with an opportunity to learn up close about how districts can successfully address IT evaluation. The final section presents some implications for practice, policy, and research.

The District Context

Attempting to understand how districts address the evaluation of their IT initiatives requires an appreciation of the broader context in which these actions take place. We have identified five contextual variables as important.

1. District evaluation capacity. Except in large districts, there is seldom a substantial organizational capacity to design and conduct program evaluation. When evaluation is required, it is often procured from external organizations or individuals. If internal, it is typically applied to collecting and analyzing student test data and not to designing and undertaking comprehensive program evaluations, particularly over a multi-year period. Few districts allocate substantial resources to internal or external program evaluation. Most do not address standards for evaluation (Sanders, 1994) or even for systematic learning (Senge, 1990; Garvin, 1993; Schein, 1993). Thus, it is not uncommon to observe exemplary practices in one school that are undocumented and sometimes unknown in other schools in the same district. Despite the recent interest in school-based action research (Glantz, 1998), most districts do not have the resources to conduct formal research. Few districts have developed a comprehensive action research function and the organizational capacity to implement it.

2. District use of research and evaluation. Even when research results and evaluation information are available, decision-makers at every level—teachers, administrators, and school board members—do not regularly use such information to guide their work. There is neither a well-established culture for data-based decision support in school districts and schools nor are most administrators skilled in transforming performance data into useful reports for teachers and stakeholders (Berliner, 1998; Streifer, 1999). Although recently promulgated standards for school leaders address these important competencies and dispositions (CCSSO, 1996), most principal preparation programs have yet to augment their curriculums in this area. The absence of detailed documentation and evidence of what works handicaps decisions about replication and scaling. Moreover, the historical boundaries between researchers and practitioners impede productive and seamless linkages between knowledge development in higher education and research organizations and schools (Hargreaves, 1996). It does not help that few schools of education and school leadership programs have thus far served as models of technology use.

3. Evaluation provisions in IT plans. Although most planning models and guidelines include attention to evaluation (e.g., Lumley & Bailey, 1993; Massachusetts Software Council, 1994; NSSE, 1996), most district IT plans give little or no attention to documentation and evaluation. Objectives are usually not stated as outcomes and in measurable terms. Indicators and performance measures are seldom stated clearly enough to guide data collection and analysis. Districts expend most of their IT resources on designing and building the IT infrastructure and training staff; there are few resources left for monitoring and evaluation.

4. Critical mass. As Alan Kay and others remind us, the technology revolution has hardly begun (Kay, 1998; Negroponte, 1995). The critical mass of telecommunications infrastructure, hardware and software, trained teachers, and technology-rich student learning opportunities needed to produce and sustain an impact is not yet available in most districts (NCES, 1998). Although there are varying opinions about what constitutes critical mass (Moursund, 1999), it is clear that the scope of the IT intervention thus far is of insufficient mass and so primitive to render premature evaluation judgments about impact on student learning (Glennan & Melmed, 1996). As Green states, "It is still premature to talk about a technology-driven *transformation* of educational institutions because virtually all schools and colleges are still in the early stages of adopting and incorporating various kinds of IT resources into their instructional functions. And it is hyperbole to discuss a technological revolution in education, which implies a sudden and dramatic departure from past practices—practices that reflect, in part, academic traditions that are centuries old (1999, p. 12)."

5. Multiple decision-makers. School leaders must inform multiple audiences about student, program, and organizational performance. Such is the case with technology applications. Each

audience defines success with different indicators. For example, many stakeholders outside the schools often expect the use of IT to significantly increase student performance on state assessment measures. Typically, these groups are looking for impact to show up sooner rather than later. These individuals and groups (legislators, state policy makers, and even members of the community at large) neither expect nor respect evaluation data based solely on illustrative vignettes. On the other hand, those inside the system-- teachers and administrators--have little respect (but lots of fear) for test data, preferring instead rich description of changes in learning opportunities and higher levels of student engagement. Teachers often want information on best practices. Any evaluation system must be able to provide a diversity of performance information that each audience will accept and respect.

These conditions serve as a context for a closer examination of how districts design and implement evaluation of IT initiatives. Before moving to that examination, however, I will briefly describe the major features of the IT evaluation system we advocate.

IT Evaluation System Features

Our technical assistance to districts with respect to IT evaluation had two objectives: 1) produce information about implementation and impact that will inform the refinement of the IT plan and its implementation, and 2) enhance the capacity of district personnel to collect, analyze, and use data to inform their decisions about technology applications. The system design is intended to be rigorous yet simple enough to be incorporated into the day-to-day work of school leaders and scalable to accommodate ongoing changes and expansion. The system focuses on five components:

Multiple Indicators and Measures

We advocate the use of five types of performance measures to guide data collection.

1. Outcomes. Measures of results, such as student learning, equity of access to technology, and quality and quantity of technology-rich student learning opportunities provided by teachers.
2. Output. Measures of products and services provided, such as the number of teachers trained, number of curriculum guides with embedded technology skills, and number of classrooms connected to school and district telecommunication networks.
3. Input. Measures of resource allocation and use, such as the ratio of students to computers, resources allocated to education, training, and support activities, and allocation of technology resources across schools.
4. Productivity. Measures of work performance, such as time to install school networks, hours of training required to prepare teachers to use technology in their classrooms, and mean time to respond to requests for technical assistance.
5. Demand. Measures of potential market, such as the number of requests for pedagogical and technical assistance, number of teachers needing specific types of training, and number of classrooms with obsolete equipment.

Each of these five types of indicators can be used to describe conditions or performance at the district and school levels. Of course, an input indicator at one level can be an output indicator at another. For example, the number and percent of teachers requesting technical support may be a demand indicator for the district technology coordinator and an impact indicator for those responsible for providing professional development. Like Einstein's perspective on time, what one sees is a function of where one stands in the overall system. Appendix A provides examples of the five types of indicators as applied to IT applications in teaching and learning. The system can address indicators for administrative and management applications as well.

District decision-makers must achieve a consensus on what information they will need to support their decisions. Which objectives and initiatives are most essential to the whole enterprise? What questions do various stakeholders have? We stress a focus on outcomes rather than on the completion of activities. For example, what changes have taken place in teachers' classroom practices rather than how many teachers have participated in how many workshops?

Balanced Attention to Implementation and Impact

The evaluation design addresses both implementation and impact. Because plans seldom get implemented as written, districts need to watch implementation carefully. Implementation monitoring typically addresses these questions such as:

1. Were tasks completed as designed? Were implementation timelines met? On budget?
2. What barriers were encountered during implementation? How were they addressed?
3. What changes were implemented? Why? To what effect?
4. What are the implications of these mid-course corrections for redesign?

Implementation monitoring usually is addressed to all five types of indicators, with the possible exception of outcomes.

As part of the IT planning process, districts identify specific indicators and measures for each priority objective. They identify these indicators by reviewing literature and research as well as crafting their own indicators. Jones *et. al.* (1995), for example, have identified key indicators for engaged learning and for high technology performance and proposed a process for using those indicators to assess the effectiveness of individual technologies and technology-enhanced programs in support of engaged learning. Her approach identifies proximal indicators based on explicit or implicit theories of action supporting the use of technology applications in teaching and learning. Others have also suggested similar variables and impact indicators (Dwyer, 1994; NSSE, 1996; Means & Olson, 1996; Quinones & Kirshstein, 1998).

Multiple Data Collection and Reporting Strategies

The system calls for collecting both quantitative and qualitative data. A variety of data collection instruments and procedures are employed: journals, critical event logs, documentation, group interviews, and focus groups are employed along with quantitative measures. The system employs multiple methods and instruments for helping everyone to watch performance and contribute mid-course adjustments. All data collection is addressed to the indicators and performance measures established in the IT plan. Data are analyzed and reported in real time and in multiple formats.

Use of IT for Evaluation

The system employs databases, preferably electronic, for collecting, organizing, and disseminating data and information in diverse forms to serve multiple audiences. For example, the system provides guidance in developing databases of best practices in several categories--teaching and learning, communications, and administration. These databases address what is working and why and what is not working and why. Databases can also be used to set up discussions on various instructional and administrative strategies; even chat rooms among teachers and principals are very useful. The intent is to make information available to all using the district's telecommunications infrastructure as well as more traditional means. Kaplan & Norton (1996), for example, suggest the use of electronic databases and "balanced scorecards" to automatically alert and "informate" (Zuboff, 1988) those who need to know about specific data, such as a principal tracking a new program's performance or a teacher watching her students' learning on a key learning standard. In districts with more advanced IT systems, Web-based databases can capture, organize, and make widely accessible information on the scores of small, immediate adjustments made during implementation. These systems can provide up-to-date information on the status of each indicator.

Enhance District Capacity

Since a principal objective is to enhance the district's evaluation capacity, major attention is given to helping the district establish an organizational capability to collect, analyze, and use the data. Unless district administrators and teachers can make sense of what is going on, the system will be of little use. Part of the technical assistance, therefore, is devoted to nurturing a disposition to use the system to produce useful information. This part of the work has benefits in addressing larger district capacities that go beyond evaluating information technology applications. For this reason, we advocate that the district establish a committee to oversee the IT evaluation of staff responsible for such functions as curriculum and instruction, staff development, and assessment as well as technology.

Rather then centralizing the responsibility for IT evaluation in the technology department or with technical specialists, we advocate assigning data collection on indicators to those personnel/organizational units accountable for accomplishing the objectives related to those indicators. Thus, principals and staff development providers are responsible for providing education, training, and support to teachers, so they are accountable for collecting information on the indicators.

The evaluation system and its use are still evolving; the design and process are highly customized in each district. The system is based on best evaluation practice with a heavy emphasis on helping districts incorporate into their operations a habit of systematically watching indicators that matter to them and those they serve, directly and indirectly. Our experience is that few districts make a commitment to address all components and tasks.

Findings

Based on work to date in districts and schools of varying size, we have identified several preliminary findings. These findings are derived from participant observations, structured and unstructured interviews, focus groups, and document reviews conducted over the last three years. Most of what we have learned about IT evaluation thus far can be organized into three areas: IT planning, IT evaluation design, and IT evaluation implementation.

IT Planning

It was often possible to trace a substantial part of the problems with IT evaluation to faulty IT planning and design. It appears that the planning process predisposed school practitioners as well as other stakeholders to see IT as a separable system requiring isolated and unique attention. Moreover, although most planning models mention evaluation, it was seldom addressed as an integral part of the plan. In many cases, the design of the plan actually precluded serious attention to evaluation. While this variable will be examined more carefully in future research, we have at this stage identified three major reasons for this problem.

Multiple and unconnected plans. Most districts had two or more plans that were not well integrated. For example, it was not uncommon for a district to have a strategic plan and a technology plan with few linkages. Often the strategic plan had a strategic initiative addressing IT, but in most cases the integration of the IT plan with the strategic plan was weak or non-existent.

Inadequate IT Plans. IT plans were weak in several areas; an inordinate focus on the IT infrastructure, a narrow vision, and inadequate attention to staff and organizational development were most prominent. Most important for this research, plans often failed to delineate objectives

addressing improvements in teaching and learning. It was unusual to find a plan that provided objectives and action plans related to the redesign of student learning opportunities with technology.

Shared Expectations of Success. IT planners often failed to transform their technology vision statements into a shared definition of what they considered success. Thus, merely installing hardware, software, and networks were viewed by some as success while others looked for objectives relating to student learning. Even those who focused on student learning often were not clear about the specific student learning results they expected.

IT Evaluation Designs

We identified three specific problems relating to IT evaluation designs.

Mindsets regarding IT. What gets evaluated was determined by the images that planners formed about IT applications. Despite the evidence that IT can support a substantial transformation of learning opportunities and environments (Collins, 1991; Madian, 1991; Jones et. al., 1995; Means & Olson, 1995; Salomon & Perkins, 1996), most IT plans addressed relatively mundane applications that did not challenge the prevailing pedagogy. The use of such applications was most prevalent in urban classrooms where the technology was addressed to low-level skill development at the expense of more holistic and engaging learning opportunities.

Dispositions toward IT evaluation. A key factor impacting the scope and quality of IT evaluation systems was the way that key decision-makers in the district or school viewed IT and its potential impact on their mission and strategies. Those who saw IT as a separate entity tended to see IT evaluation that way as well. Despite the age-old admonition to build in evaluation, it was either ignored or bolted on to the plan. In a small minority of districts where IT was integrated into the district strategic plan, the integration of evaluation of its impact was integrated as well. Even in such circumstances, however, there was no guarantee that IT evaluation would be accomplished well or at all. In some districts, for example, administrators believed that evaluation consisted of determining whether reading scores had improved as a result of IT applications.

Narrow indicators and measures. Districts tended to address indicators dealing with building the IT infrastructure or with assessing impact on student achievement as measured by standardized tests. None of the districts developed indicators relating to such variables as changes in student learning opportunities, engagement in learning, and attention to higher order or complex learning. In short, evaluation plans seldom if ever focused on developing a deep understanding of what impact IT was having on what students experience. There was little or no attention to examining the chain of evidence relating to a theory of action regarding IT's impact on learning. Districts tended to rely on anecdotal data, but without the rigor or the comprehensiveness that would constitute high quality data support. Districts' IT evaluation designs failed most in understanding what Salomon (1991) calls the systemic nature of their IT initiatives. Most IT applications consisted of a rich soup of highly interdependent interventions that impacted one another in highly complex ways.

Evaluation Management

Most districts treated IT evaluation as a compartmentalized responsibility assigned to the IT department or selected IT staff. Data collection was often conducted by the IT staff or by the district central office evaluation staff. Other district staff members, such as those dealing with curriculum development, staff development, and assessment, seldom engaged in IT evaluation or saw it as their responsibility. They saw the data on IT's effectiveness as peripheral to their own missions. IT staff members were usually so burdened with the technical tasks of installing and maintaining the infrastructure that time for evaluation

was limited. Moreover, their focus was usually on the technical aspects of the system as distinguished from its classroom applications.

Implications for Practice, Policy, and Research

The objective of our ongoing work is to better understand how districts and schools plan, design, and conduct evaluation of their IT initiatives in order to inform improvement and redesign. Through intensive case studies and collaborative learning and work with districts and schools, we have formed several insights about the facilitators and impediments to IT evaluation. The following implications are based on those findings.

Despite the fact that many districts were well into their second or third cycles of IT planning, few had a comprehensive evaluation in place to provide information on implementation and impact. IT evaluation received a low priority from most districts, with few having any system in place. In those districts that did undertake IT evaluation, the task was often either poorly designed or not managed well. IT evaluation designs often focused on the wrong questions, employed inadequate designs, and failed to employ systematic analysis and ongoing reporting of findings to decision-makers and stakeholders. Districts failed to watch in any systematic way the way that IT actually was implemented and what effects it had. There was little documentation of the interventions being implemented. Results were neither clearly specified nor focused on student learning. There was no process for building a shared commitment to results. Responsibility for evaluation was often isolated within districts' IT departments.

IT Planning

In many cases problems with IT evaluation originate in flawed IT planning. With the early stages of IT planning so focused on installing equipment and networks, the lack of strategic thinking focused on transforming teaching and learning is not surprising. Most districts use the technology to automate or augment their current curriculum and pedagogy rather than think about a new one. Plans therefore give little attention to redesigning learning opportunities, learning environments, and pedagogy. IT evaluation, therefore, gives little or no attention to these areas.

While districts often linked their strategic plans with their IT plans, such linkages may not be sufficient to accomplish integration. Instead, it may be necessary to incorporate IT planning directly into the district's strategic or improvement plan. This one plan would provide the overarching framework for improvement and delineate how IT will contribute to that improvement. While specific initiatives such as the installation of the telecommunications network might require ongoing implementation planning, from a strategic perspective there may be no need for a separate strategic technology plan. Instead, all technology planning should be focused on what technology applications are required to advance the district's annual performance goals in support of its reform initiatives. With the principal focus on the district's overarching improvement plan, IT indicators of success linked to strategic objectives could focus the IT evaluation.

In large districts where there is likely to be a chief technology officer who is at cabinet level, there appears to be a greater chance for integrating the IT plan with the district's strategic plan. This is not the case in smaller districts where the "chief technology officer" is often a technical specialist without program and policy perspectives. Integration of IT planning into the district improvement planning and plan might produce another benefit: the involvement of the district leadership in understanding how IT can contribute to the district's priorities for improvement. Because district superintendents typically lead strategic planning efforts but seldom participate on technology planning committees, merging the two planning efforts would serve to engage district leaders in assuring technology integration at all levels.

Federal and state requirements as well as district practices that require or promote separate planning and plans may work against the desired results. IT integration into student learning opportunities and environments will likely be impeded by inadequate integration at every other level.

Further investigation of IT planning and its attention to evaluation might focus on these questions:

- How is IT planning accomplished?
- What is the relationship between strategic or improvement planning and IT planning?
- What data on implementation and impact are employed in the planning process? What is the quality of that data?
- What is the role of the district superintendent in IT planning? What roles do curriculum directors, staff development coordinators, and other central office staff have in IT planning?

IT Evaluation Design

IT design has not, in most cases, provoked a systematic and rigorous approach to evaluation, even in districts that are undertaking a serious redesign of student learning opportunities and learning environments. Faulty evaluation design often precludes the likelihood of collecting any useful information. Several factors appear to be important; prominent among them is selecting variables and indicators and employing appropriate measures and methods.

Selecting appropriate variables and tracking relevant indicators poses the most challenge for districts. Practitioners recognize what researchers lament: Distilling out the unique contribution of IT in a complex intervention is a formidable task. Rather than attempt such a distillation, Salomon (1991) and others (Pappert, 1987; Liu, Macmillan, & Timmons, 1998) argue that we need, at this early stage of our use of technology in schools, to embrace the complexity and seek to document its dimensions.

As Hativa and Lesgold (1996) point out, the whole learning environment changes, making it difficult to undertake analytical studies, particularly in schools. IT applications need to be viewed as complex bundles of changes. It is unlikely that districts have enough regression analysis tools to accomplish the distillation required for analytic work with respect to most of these variables. Districts implement a bundle of interventions when they introduce technology in support of teaching and learning. Thus, they need to examine the interface between IT and the curriculum materials, content, pedagogy professional development, assessment, and the learning environment. In many instances it is too soon for analytic approaches that attempt to isolate the unique contribution of the technology on student performance, particularly when measured by standardized tests. There is a need for a balanced attention to analytic and systemic approaches (Salomon, 1991). Rich description is needed.

Rather than attempting to distill out the unique contribution of IT to a specific initiative or even to a specific learning outcome, it might be better to use more holistic, qualitative data to rich descriptions of what is happening in classrooms and with learning opportunities. In many cases information technology's real impact may be in areas that are not under the analytic spotlight. It will take a systemic approach to illuminate the issues and their interactions. A system that collects rich/thick description may be more appropriate and is the role that practitioners may be able to perform best. The challenge is to create simple systems for teachers to collect data on the learning partnerships that Salomon says may be an indicator of high-performance learning.

IT's real impact may be in areas receiving little district attention. Instead of asking, "Do computers work," districts need to ask, "What specific applications, under what circumstances, appear to contribute most to increased student learning?" With such a system in place, the district can be more precise in addressing questions about the broad impact of IT investments as well as on more specific questions

regarding specific outcomes. Districts need rich description as well as quantitative data on a diverse set of variables, most often focused where the real impact may be—on the nature of the learning process itself

Districts need to follow standards for assuring quality data collection and analysis. Decision-makers must have confidence in the reliability and validity of the data. They must create simple ways to collect robust qualitative data. These can best be captured through journals and critical event logs. These methods are resource intensive but valuable. This is the rich descriptive data that captures the complexity of the applications.

Policy makers at federal and state levels need to promote these systemic approaches by collecting qualitative as well as quantitative data from districts and helping them to analyze it. State education agencies and colleges and universities could help as well with collecting and disseminating descriptions of practices and their results in classrooms.

State education agencies might provide technical assistance to district staff in designing and implementing IT evaluation systems. In higher education, the Flashlight Program, for example, offers help to colleges and universities in evaluating their IT applications ((Ehrmann, 1999).

Further investigation of IT evaluation might focus on these questions:

- What do districts evaluate with respect to technology applications?
- How do districts conduct IT evaluation? What data collection systems are in place?
- What systems do districts establish for documentation and sharing?
- What roles do curriculum directors, staff development coordinators, and other central office staff play in IT evaluation?

IT Evaluation Implementation

Three things would improve the implementation of IT evaluation in districts and schools: 1) increasing the frequency of data collection, 2) decentralizing responsibility for IT evaluation throughout the district, and 3) increasing the dissemination of evaluation information throughout the district and to the community.

Data collection needs to be ongoing and linked to key indicators. Evaluation needs to provide regular, real-time, ongoing data flowing throughout the organization and beyond about what works and what changes are being made. Rather than waiting until the end of the year or the end of a project, data must be provided on an ongoing basis. Decision-makers must use the data in the real-time flow of decisions. The intent of the evaluation should be to encourage and support staff in watching implementation in a more systematic and sophisticated manner. This is consistent with an action research orientation.

The locus of responsibility for IT evaluation appears to be a factor in determining whether and how well it is accomplished. The organizational disposition to compartmentalize functions works against an integrated approach to IT evaluation. Rather than assign responsibility to the IT technical staff, therefore, it might be more productive to decentralize it.

Districts might establish a committee to continue the work of the group that provided oversight to the development of the technology plan. The committee might be expanded to include more school personnel who are close to the implementation of selected technology initiatives. More directly, oversight of the data collection process should be assigned to those personnel/organizational units accountable for accomplishing the objectives related to those indicators. When specific staff members are accountable for certain outcomes, they will have a built-in self-interest in the scope and quality of the data they require. If this alignment of need and use is not established, communication is defined as a problem of dissemination

-- convincing various people to access data they are not convinced they need. The committee might meet quarterly and use e-mail to meet electronically as needed to review data and to comment on needed mid-course corrections.

The assessment process needs to be simultaneously top-down and bottom-up, gathering information from the operating system about what is happening in schools with respect to the objectives, what new or enhanced interventions are needed to obtain the results, and what new or unanticipated outcomes and results are being realized.

Districts would benefit substantially from an increased attention to organizational learning and knowledge management with respect to IT. To accomplish this, some districts use simple, electronic Web-based databases for collecting, organizing, and disseminating data and information in diverse forms. One example that is quite useful is to develop databases of best practices in several categories: teaching and learning, communications, and administration. These databases can address what is working and why and what is not working and why. Databases are also used to set up discussions on various instructional and administrative strategies; chat rooms among teachers and principals are very useful. Prepare a public database for communicating results to the larger community.

Districts need to prepare a portfolio of program assessments and regularly updated reports of the specific technology initiatives implemented in response to specific district and school reform initiatives. These reports can serve as a component of a tracking mechanism for monitoring implementation of specific elements of the technology plan.

Further research to enlarge our understanding should address these questions:

- How is responsibility for IT evaluation assigned? Is there a relationship between the locus of responsibility for IT evaluation and its implementation? Is there a relationship between the locus of responsibility for IT evaluation and its use in decision making?
- What roles do curriculum directors, staff development coordinators, and other central office staff have in IT evaluation?
- How do districts communicate evaluation information to key decision-makers?

Improving IT evaluation is important not only because of the substantial investments districts are making in information technology but also because: a) we are at the early stages of what potentially is a learning revolution, b) the public needs to know, and c) our understanding of IT's impact is so limited. It is important for researchers to connect to what is actually happening in practice, not just in pilot projects and demonstration programs but in schools and classrooms throughout the country.

Public support for continuing investments in technology are likely to wane unless districts and schools can communicate effectively about the impact of IT on teaching and learning. This will require a quantity and quality of information that is usually available from pilot or demonstration projects with research-based designs. The continuing challenge is to help schools set up data collection systems and help them make sense of the data for ongoing improvement and redesign. The research community cannot ignore the sorry state of IT evaluation in districts and schools. Future efforts must focus on:

- Developing a better understanding of district IT evaluation through more focused research.
- Helping practitioners through partnerships with researchers not only to conduct the evaluation but also to build their capacity to collect better data for their own learning.

References

Berliner, D. (1997). Voice training. *Review*. 37(2), 1,9,14-15.

Bloom, Gary. (1999). Doorstops...or deliverance? *Thrust for Educational Leadership*, 28(4), 24-27.

Bryson, M., & deCastell, S. (1998). New technologies and the cultural ecology of primary schooling: Imagining teachers as luddites in/deed. *Educational Policy*, 12(5), 542-567.

Center for Educational Leadership and Technology. (1997). The Board of Education of the City of New York: Strategic technology plan. Marlborough, MA: Author.

Center for Educational Leadership and Technology. (1998). The School District of Philadelphia: Information technology plan. Marlborough, MA: Author.

Collins, A. (1991). The role of computer technology in restructuring schools. *Phi Delta Kappan*, 73(1), 37-40.

Council of Chief State School Officers. (1996). Interstate school leaders licensure consortium: Standards for school leaders. Washington, DC: Author.

Dwyer, D. (1994). Apple classrooms of tomorrow: What we've learned. *Educational Leadership*, 51(7), 4-10.

Erhmann, S. (1999). Asking the hard questions about technology use and education. *Change*, 31(2), 25-29.

Garvin, D. (1993). Building a learning organization. *Harvard Business Review*, 71(4), 78-91.

Glanz, J. (1998). Action research: An educational leader's guide to school improvement. Norwood, MA: Christopher-Gordon Publishers, Inc.

Glennan, T. K., & Melmed, A. (1996). Fostering the use of educational technology: Elements of a national strategy [Online]. Available: http://www.rand.org/publications/MR/MR682/contents.html.

Green, K. (1999). When wishes come true: Colleges and the convergence of access, lifelong learning, and technology. *Change*, 31(2), 11-15.

Hargreaves, A. (1996). Transforming knowledge: Blurring the boundaries between research, policy, and practice. *Educational Evaluation and Policy Analysis*, 18(2), 105-122.

Jones, B. F., *et. al.* (1995). Plugging in: Choosing and using technology. Oak Brook, IL: North Central Regional Educational Laboratory.

Kaplan, R., & Norton, D. (1996). The balanced scorecard. Boston: Harvard Business School Press.

Kay, A. (1998). Keynote address at the annual EduCom conference, October 15, 1998. Orlando, Florida.

Liu, X., Macmillan, R., & Timmons, V. (1998). Assessing the impact of computer integration on students. *Journal of Research on Computing in Education*, 31(2), 189-203.

Lumley, D., & Bailey, G. (1993). Planning for technology: A guidebook for school administrators. NY: Scholastic, Inc.

Madian, J. (1991). Technology's place in curriculum reform. *ISTE Update*, 3(7), 1-2.

Massachusetts Software Council, Inc. (1994). The switched-on classroom: A technology planning guide for public schools in Massachusetts. Boston: Author.

Means, B., & Olson, K. (1995). Technology's role in education reform. Menlo Park, CA: SRI International.

Moursund, D. (1998-99). Is information technology improving education? *Learning and Leading with Technology*, 26(4), 4-5.

National Center for Education Statistics. (1998, February). Issue brief: Internet access in public schools. Available: http://nces.ed.gov/pubs98/98031.html.

National Study of School Evaluation. (1996). Technology: Indicators of quality information technology systems in K-12 schools. Schaumburg, IL: Author.

Negroponte, N. (1995). Being digital. New York: Alfred A. Knopf.

Oppenheimer, T. (1997, July). The computer delusion. *Atlantic Monthly*, 280(1), 45-62.

Pappert, S. (1987). Computer criticism vs. technocentric thinking. *Educational Researcher*, 16(1), 22-30.

Postman, N. (1995). The end of education. NY: Alfred A. Knopf, Inc.

Quinones, S., & Kirshstein, R. (1998). An educator's guide to evaluating the use of technology in schools and classrooms. Washington, DC: Pelavin Research Center.

Roblyer, M. (1996). Is research giving us the answers we need? *Learning and leading with technology*, 26 (4), 14-18.

Salomon, G. (1991). Transcending the qualitative-quantitative debate: The analytic and systemic approaches to educational research. *Educational Researcher*, 20(6), 10-18.

Salomon, G., Perkins, D., & Globerson, T. (1991). Partners in cognition: Extending human intelligence with intelligent technologies. *Educational Researcher*, 20(3), 2-9.

Salomon, G., & Perkins, D. (1996). What computers offer education. In Kerr, S. (Ed.), Technology and the future of schooling (111-130). Chicago: University of Chicago Press.

Sanders, J. (Ed.). (1994). The program evaluation standards. Thousand Oaks, CA: Sage Publications.

Schein, E. (1993). How can organizations learn faster? The challenge of entering the green room. *Sloan Management Review*, 34(2), 85-92.

Schwartz, J. (1989). Intellectual mirrors: A step in the direction of making schools knowledge-making places. *Harvard Educational Review*, 59(1), 51-61.

Streifer, P. (1999, March 17). Putting the 'byte' in educational decisionmaking. *Education Week*, pp. 53, 56.

Stoll, C. (1995). Silicon snake oil. NY: Doubleday.

Technology Applications Associates. (1995). Technology plan for the New London Public Schools. Cranston, RI: Author.

Zehr, M. (1998, October 1). The state of the states: Technology counts '98 [Special issue]. *Education Week*, pp. 69-71.

Zuboff, S. (1988). In the age of the smart machine: The future of work and power. New York: Basic Books.

Appendix A
Examples of Indicators

Indicator	Teaching & Learning
Impact	• quantity and quality of student writing • % of teachers using technology applications in their day-to-day teaching
Output	• # of workshops provided to teachers, administrators, and staff • #/% of teachers, administrators, and staff trained • % of time network is in service
Input	• #/% of classrooms networked • student/computer ratio
Productivity	• # of training hours needed to achieve a specific teacher competency, such as use of the Internet • time devoted to taking and reporting attendance
Demand	• # of teachers and administrators requesting training and support • # of parents requesting training and support